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OF

LECTURES

ON THE

INSTITUTES OF MEDICINE.

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IN drawing up such an Outline of these Lectures, as I trust may be of some use to the Gentlemen attending them, I have thought it right to explain myself most fully on those parts of the subject, on which there seemed most reason to fear that the substance of the Lectures might be misapprehended by the hearers ; and this must be my excuse for the space that has been allotted, in the following pages, to certain discussions which may appear somewhat abstruse.

EDINBURGH, }
October 1828. }



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HEADS
OF
LECTURES
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INSTITUTES OF MEDICINE.

THE Course of Lectures on the Institutes of Medicine, will consist of three great divisions;—the first comprehending Physiology, or the study of the functions of the living body in the healthy state;—the second Pathology, or the study of the changes which these undergo in disease;—the third Therapeutics, or the study of the action of remedies on the living body.

PART I.
PHYSIOLOGY.

Preliminary Statements.

Under this head, we endeavour first, to deliver the history and explanation, so far as is possible, of all that takes place in the living body,—when fully formed, in the

adult state, and in the full enjoyment of health,—different from what takes place in the dead body. Afterwards, we explain the manner in which the body gradually attains the state of perfection in which we first considered it.

We give the name of Life, whether in Animals or Vegetables, to a certain assemblage and succession of phenomena, of which the most characteristic, essential to all the others, is Nutrition. These phenomena we *describe*; and then, in so far as we can satisfy ourselves that these are inconsistent with mechanical or chemical principles, (such as are observed to regulate the changes that take place in other departments of Nature), we say that they are the effects of the *Vital Principle*, or of *Vitality*; and that is our *definition* of these terms.

The explanation of physiological facts must always terminate in a reference to certain Laws of Vitality, or ultimate facts in this department of nature; of which we can give no other account, than that they depend on the will of the Author of Nature.

Although the subject is but imperfectly investigated, enough has been done to enable us to treat of the functions of the living body, as they exist in the adult state, *synthetically*, or in the order of their dependence, partly on such general laws, and partly on one another; so that the Physical Cause of each function shall appear, at least in part, from the subject treated before it, and its Final Cause, or uses, from those treated after it. Several advantages seem to arise from this arrangement, particularly in a Course addressed to Students who have already acquired a considerable knowledge of Physiology during their anatomical studies, but have not been accustomed to regard the functions of the living body systematically, or as connected into a perfect whole.

The great and essential division of the phenomena of the living body, is into the departments of Organic and Animal Life, as distinguished by BICHAT; or into those which do not imply the intervention or consciousness of the Mind,—and those in which some act of the Mind is essentially concerned; and the former are clearly subservient to the latter. This distinction will always be kept in view, but cannot be strictly observed; the more complex functions (as Respiration and Digestion) comprehending phenomena which come under both heads.

The first object will be, to lay down what appear to be the chief Laws of the VITAL CONTRACTILE POWER of living parts, the Irritability of HALLER. This power is essential to all the living functions; all attempts to refer it, either to mechanical or chemical principles, or to other phenomena of the living body, have failed; and its existence appears to be an ultimate fact in Physiology. The most important general facts ascertained in regard to this property, in animated beings, will be stated under the following heads:

1. Its description, as exhibited in its most distinct form (strictly called *Irritability*) in the contraction of muscular fibres, from the application of stimuli.

2. The modification of it, observed in different textures, and called *Tonicity*.

3. Its varieties in different animals, and different parts of the same.

4. Its connection with the Nervous System in animals, by changes in which, this property is readily excited into action in certain parts of animals,—and is modified and controlled probably in all;—but on which it does not, in any case, appear to be dependent.

5. The influence exercised over it by Heat and Cold, by Electricity, and other agents, such as various Poisons.

6. The dependence of its exercise, in all living solids, on a constant supply of Fluids, and on the purification of these fluids by Oxygen ;—which objects are accomplished, in the order of things now established on earth, first by the living actions of the progenitor of each organized body, and afterwards by the living actions of certain parts of each body itself.

7. The alterations which it undergoes, in consequence of the degree in which it is exercised in any living part.

8. The gradual change which it undergoes during the progress of life, connected with a change in the organization of the parts in which it resides.

As an effect of the exercise of this property of the living solids, we trace the movement of the fluids in the body ; *first*, The movement of the mass of Blood in the heart, arteries, and veins, or the function of Circulation ; and, *secondly*, The continual evolution of matters from, and absorption of matters into, the mass of blood, or the functions of Nutrition, Exhalation, Secretion, and Absorption ; to which, in Man, and the higher classes of animals, the function of Circulation is subservient, and on which all the other functions are dependent.

Of Circulation.

General view of the Use of the Organs of Circulation, illustrated by Comparative Anatomy ; the nourishment of the body, from a fluid corresponding to the blood, takes place in all animals, and all their parts ; but this function exists only in those animals in which the exposure of the blood to the air takes place in a distinct organ.

Outline of the Course of the Blood in the body, with the evidence by which it is known.

Examination of the Structure of the Heart.

Phenomena of the ordinary action of the Heart, and their explanation. Futility of all attempts to trace this subject farther than to the general laws of vital contractions above laid down.

Structure and Course of the Arteries.

Phenomena of the Movement of the Blood in the Arteries, and their explanation. Proofs that the Arteries exert a truly vital action on the Blood,—distinct from elasticity, but also differing from the action of the heart, and of other strictly irritable parts.

Difference in the amount of this action in the small capillaries, and in the larger trunks of arteries. Motion of the Blood in the Capillary vessels, perhaps influenced by other causes, besides the contractile power of any of the organs of circulation.

Structure and Course of the Veins. Phenomena of the Movement of the Blood in them, and their explanation.

The Circulation through the Lungs briefly considered in the same order.

Of the Composition and Properties of the Blood.

It consists, in the living body, of a clear fluid, and red particles; the first of which spontaneously divides itself into Serum and Fibrin.

Physical and Chemical properties of these.

Phenomena of the Coagulation of Blood, and means by which it is retarded, promoted, or prevented. Facts which

shew that the physical and chemical properties of the blood, in the living body, are subjected to laws that have no influence on it in the dead state, and which therefore indicate Vitality in the blood.

Differences of Arterial and Venous Blood.

Of Nutrition, Exhalation, and Secretion, in general.

Proofs that the nourishment of the Solids, and supply of the prepared Fluids of the body, are from the Blood.

Statement of what is known of the manner in which the parts of the blood, destined to these purposes, are extravasated.

Cases in which substances, which are eliminated from the blood in these ways, have been detected already formed in the blood itself, or in different parts of the System from those in which they usually appear.

Brief remarks on the insufficiency of the principal theories, which have been formed to explain the formation, or evolution, of so many different compounds from the same blood.

In this part of our subject, we see clear indications of a Vital Property, varying in different parts of the animal system, and causing these to be differently affected by, and to produce different effects on, the blood which pervades them. The best name that has been given to this general property is VITAL AFFINITY: its existence will no doubt always be an ultimate fact; but the limits of its agency, and the manner in which it modifies the chemical relations of the substances subjected to it, are probably susceptible of farther development than they have yet received.

Of Absorption.

Structure and Course of the Lymphatics.

Composition and properties of the contents of the Lymphatics.

Phenomena of the movement of their contents.

Proofs that Capillary Attraction and Elasticity are insufficient to explain these phenomena, and that the contents of these vessels must be moved by a vital power.

Statements, by MAGENDIE and others, which establish the correctness of the old opinion, that Absorption takes place by Veins as well as Lymphatics.

Probable use of the Lymphatic Glands.

The question considered, How far the peculiar qualities of all the parts of the body are dependent on continual deposition of new matter, and absorption of old ?

Of the Composition and Properties of the Matters formed from the Blood in the living Body.

We here treat of the different Tissues or Textures separately, which are variously combined in the constitution of the different sets of organs, whose functions are considered in other parts of the Course. In regard to each, we state shortly, 1st, Its physical properties, the purposes it is thus fitted to serve, and its distribution over the body for these purposes ; 2d, Its chemical properties and composition ; 3d, Its vital properties, including its nutrition and absorption, and any secretion connected with it.

In this way, we treat,

1. Of Bone, with the Medulla and the Teeth.
2. Of Cartilage.
3. Of Tendinous Substance, including the fibrous membranes.

4. Of Cellular Substance, and the fluids lodged in it.
5. Of Serous and Synovial Membranes, and their fluids.
6. Of Mucous Membranes, and their fluids.
7. Of the Substance of the different Glands, and their secretions.
8. Of the Substance of the Lungs, and the Excretions formed there.
9. Of the Skin, and its Excretions.
10. Of the Epidermis, Hair, and Nails.
11. Of Muscular Substance.
12. Of Nervous Substance, and the effects of physical agents applied to it in the living body,—on Muscular Contractions,—and on Secretions.

General observations on the Functions of the Nervous System, and on the Mental Phenomena. As the acts and affections of Mind are never objects of sense, and as Matter is, and can be, known to us only as being an object of sense, it is absurd to speak of these two existences as identical; but the Nervous System in man and animals, is the part of the living frame with which the Mental Phenomena are connected. It furnishes the physical conditions, under which these phenomena are displayed, and forms the medium, through which mental acts affect the different parts of the body. These functions it performs by means of certain physical, but truly Vital Properties, known to us only by their effects, but which are exemplified in the action of physical agents, above described, as well as in the case of mental acts; and which vary in different parts of the body.

The existence of these properties is no doubt an ultimate fact in Physiology; the laws of their action, though of peculiarly difficult investigation, are to a certain degree

ascertained. The most general name that can be given to them is NERVOUS AGENCY, or Agency of the Nervous System.

General division of the Mental Phenomena into Sensations and Thoughts.

Muscular actions are excited, through the agency of Nerves, by certain Sensations, by certain Emotions, and by Instinctive or Voluntary Efforts of mind. A short illustration of these kinds of excitation is necessary to enable us to treat of the two next functions.

Of Respiration.

General view of the provisions made for the application of Oxygen to the fluids in the different classes of animals, and of the adaptation of these to their circumstances and wants.

Venous blood, circulating in the lungs, in the human body, and other animals whose respiration is similar, causes a peculiar sensation: this sensation excites, through the agency of nerves, a peculiar combined action of certain muscles; which dilates the chest, and admits the air.

Mechanical changes of the different parts concerned in the respiratory actions.

Chemical action of the air that enters the lungs, with the blood that passes through them.

Question, Whether oxygen is absorbed into the blood, or only dissolves excreted carbon?

Uses of the purification of the blood thus accomplished. It appears to be necessary,

1. In order that Animal Heat may be maintained.
2. In order that the condition of the Nervous System, requisite to the mental phenomena, may be maintained.

3. In order that the Circulation, and the vital powers of all living parts, may be maintained.

The dependence of animal life, however, on Respiration, is more immediate than that of organic life.

Of Digestion.

General view of the use of this function,—subsidiary to Nutrition in all but the lowest class of animals. Conditions which appear essential to its performance, and provisions adapted to these, in the different classes of animals, destined to draw their nourishment from different sources, and under various circumstances.

General remarks on Appetites and instinctive movements, such as those on which this function is dependent.

The reception of food into the Stomach.

The vital action of the Stomach, both of its moving fibres and of its secreting surface, and the subsidiary secreting organs.

The chemical action of the gastric juice.

The vital action of the Intestines and subsidiary organs, and the chemical action of their secretions.

Composition and properties of the Chyme, and of the Chyle.

Course of the chyle and of other fluids absorbed from the intestines.

Probable use of the Spleen in this process.

General view of the function of assimilation,—in which not only chemical changes take place, but vital properties are communicated.

The Excretion by the bowels and by the bladder, with general observations on excretion.

Having completed the view of the functions concerned in the preservation of the organized frame, we proceed to a more detailed account of the Physiology of the Nervous System, or Functions of Animal Life.

Preliminary Observations.

Reasons for thinking that the Nervous System is not essentially concerned in any of the functions of Organic Life.

Statement of the grounds on which we assert that it is essentially concerned in all the functions of Animal Life, at least in all the higher animals.

General conditions in the state of the Nervous System, which seem necessary to the manifestation of all mental phenomena.

1. The circulation of arterial blood through the nervous matter.
2. A certain degree of pressure on it?
3. Movements of the nervous matter?

Of the Mental Phenomena.

I. Sensation in general—its modification by Habit. Consciousness—Perception.

II. The different Senses in succession : *first*, The structure of the organs employed, and physical circumstances under which the impression on the Nervous System takes place, in the case of each ; *secondly*, The Sensations that result ; *thirdly*, The instantaneous conclusions drawn by the Mind, whether natural or acquired.

1. Of Touch.
2. Of Taste and Smell.

- 3. Of Vision.
- 4. Of Hearing.

III. The other Mental Powers.

1. A brief illustration of the existence, and of the authority, of certain fundamental Laws of Belief, involving general notions which the Mind is so constituted as to form, in consequence of the exercise of the Senses. Acquiescence in these is reasonable and necessary, and enables us to set aside much metaphysical controversy.

2. Simple acts of the Mind, intellectual and moral, Conception—Memory—Abstraction—Judgment—Instincts, and corresponding Volitions—Emotions—Moral Feelings.

3. Laws according to which these succeed each other in the train of thought, Association of Ideas—Attention, involuntary and voluntary—Influence of Sensations on the train of Thought.

4. More complex acts of the mind, by which the conduct is chiefly regulated, and which imply a succession of previous simpler acts, Imagination—Reasoning—Desires, and corresponding Volitions.

Of the Physical Effects of the Mental Acts on the Living Body.

I. The effect of Volitions, including instinctive and voluntary efforts.

This is limited to the direct Excitation of certain Muscles.

Effects of this excitation in the movements of the head, trunk, and extremities, and in voice and speech.

Mechanical principles concerned in these movements.

Adaptation of the Skeleton, and other parts of the frame, to these movements.

Differences between Man and Animals in this respect.

Influence of Habit on voluntary motions, and its reference to the principle of Association of Ideas.

Effects of Voluntary Exercise on other functions of the body.

Enumeration of truly Instinctive Motions, and statement of their peculiarities.

II. The effect of Emotions of Mind ; less powerful, but more varied, than that of volitions :

1. In exciting the action of certain Muscles, thereby causing certain definite actions, such as laughter, weeping, &c.

2. In modifying the Vital Power of various living parts, particularly the Heart and Arteries.

3. In modifying the Chemical Phenomena of the body.

4. In exciting certain Sensations.

III. The effect of Sensations :

1. In exciting the action of certain Muscles ; thereby causing various definite actions, such as vomiting, coughing, sneezing, &c.

2. In modifying the Vital Power of various Living Parts.

3. In modifying the Chemical Phenomena of the body.

General Observations on the Mutual Agency of Mind and Body.

1. All the Animal Functions are remarkably influenced

by that law of the Mind, whereby it attends, in fact, only to one object at a time.

2. The Effects of Mental Acts on the Body, and especially those of *Sensations*, appear to furnish the true explanation of those phenomena, which have been thought to indicate *Sympathy* or *Consent* of different parts of the body.

3. The Effects of Mental Acts, and especially of Emotions, on the human body, appear to be *instinctively interpreted* by other men.

4. The Agency of the Mind on the Body is much guided by the natural tendency to *Imitation*.

5. An Intermission, in a certain degree, of the Nervous Agency, and a peculiar modification of all the mental phenomena, take place regularly and necessarily in *Sleep*.

In this and other respects, an analogy exists between the actions of the Nervous System, (known only by their effects), and muscular contractions.

Of the Parts of the Nervous System specially concerned in the different Mental Acts, and in their Effects.

1. Parts concerned in Sensation and Voluntary Motion.

Great discovery, by Mr BELL, of the Distinction of Nerves of Sensation and Motion.

Agency of the Spinal Cord in Sensation and Voluntary Motion.

Agency of the Brain and Cerebellum in these functions, and its limitation.

2. Parts concerned in the purely Mental Acts.

Nothing fully ascertained here, excepting the appropriation of the Brain proper to acts of Thought.

3. Parts concerned in the action of Sensations and Emotions on the body.

Attempt lately made to establish a separate class of nerves, having a peculiar origin, and appropriated to the Respiratory actions, and those associated with them. Objections to this theory.

Inquiry how far the distinction of *symmetrical* and *irregular* nerves may be concerned in the difference of the effects of voluntary and of involuntary acts of mind ; and how far the peculiarities of the *ganglionic* nerves may be supposed to fit them for being the chief agents in the *involuntary* action of the mind on the bodily organs.

Of the Function of Generation.

Conditions requisite to the performance of this function in the different classes of animals.

Conditions requisite in the human species, in particular.

1. Development of the testes and ovaria, and effects of these changes on other parts of the system.

2. Menstruation.

3. Certain sensations or conceptions, and consequent emotions of mind.

Effects produced by these mental feelings on the external and internal organs. Expulsion of the Semen ; descent of the Ovum ? Questions as to the place, and as to the mode, of the action of the semen on the ovum.

Development of the ovum. Formation and functions of the Placenta. Peculiarities of the Fœtus, and mode of its nutrition.

State of the Uterus during gestation. Its influence on other parts of the system ; and the influence of the condition of the mother on the fœtus.

Parturition, and the consequent changes in the mother.

Changes which take place in the Fœtus at the time of birth ; by which its life, previously maintained by the organic functions only, becomes truly animal, and is placed in dependence on Sensation.

Questions as to the extent and mode of the influence of the constitution and habits of Parents on their offspring.

Of the state of the Body during its Growth.

1. The peculiarities of the circulating system during this state.

2. The peculiarities of the chemical phenomena of the body, its nutrition, secretions, animal heat, &c.

3. The peculiarities of the functions of the nervous system.

Of the state of the Body during its Decline.

The peculiarities during this state considered in the same order.

Of the Differences between the Sexes, in the Functions common to both.

These peculiarities considered in the same order.

Of the Varieties of Mankind.

1. The different temperaments.
2. The varieties, consistent with health, produced by external circumstances and habits.
3. The different races of men.
4. Inquiry how far the difference of races may be explained by variety of external circumstances.

PART II.

PATHOLOGY.

THIS subject has been generally treated along with the Physiology ; but it is impossible to give a satisfactory account of the changes that take place in any disease, or even in consequence of an injury, without reference to the Physiology of different parts of the System ; and therefore all such discussions are better postponed, until the healthy condition of all the functions has been examined.

Preliminary Observations.

The alterations of structure of the various organs, or Organic Lesions, produced by diseases, present more definite objects of study, both during Life and after Death, than most other morbid phenomena. But there are frequent and fatal diseases, which do not necessarily leave any such marks behind them ; where such lesions exist, they are plainly the effects of previous diseased conditions ; and when once formed, they very seldom admit of much alteration from the use of remedies. Hence the study of these changes, although an essential, can form but a small part of a rational and useful System of Pathology.

Such a System must be mainly founded on certain *ultimate facts*, in regard to the operation of external causes on the living body, and the modes of diseased action assumed by its different parts, which are known to us by ob-

servation only, and could not have been inferred from our knowledge of the structure and healthy action of parts.

Some of these first principles of Pathology are more distinctly exemplified in cases of sudden death, and in the action of violent injuries, than in cases of disease; and therefore we premise an account of different fatal injuries, to discussions on the Pathology of any Diseases.

The effects of all causes of violent or sudden death may be referred to two modes of injury, which are perfectly distinct in some instances, although in others they appear to be blended. 1. Destroying directly the vital action of the Heart and other Organs of Circulation. 2. Obstructing the Arterialization of the Blood, and so arresting the Circulation in the Lungs.

The first effect may be produced chiefly in two ways. 1. By Concussion or Shock, destroying the vital power in the Sanguiferous System. 2. By Abstraction, sudden or gradual, of the Vital Stimulus. The second effect is also produced in two ways: 1. By injury of the Nervous System, arresting Respiration through the intervention of Insensibility or *Coma*; 2. By direct impediment to the access of Air to the Blood, producing *Asphyxia*.

To these principles we can ascribe,

1. The effect of various injuries, affecting the functions or the structure of the Nervous System.

2. The effect of violent and overpowering Emotions or Sensations.

3. The effect of Excessive Cold.

4. The effect of Excessive Heat.

5. The effect of Lightning.

6. The effect of different Poisons.

7. The effect of Hæmorrhage.

8. The effect of Fasting.

9. The effect of all means of obstructing the access of Air to the Lungs.

The fatal tendency in different diseases, and even in different cases or periods of the same, is very different, and often complex; but is always susceptible of illustration from reference to these cases of violent death.

We arrange the subject of Pathology as nearly as possible in the same order as the Physiology.

I. The *first* Head of the Diseased Actions that we examine, consists of those in which the Organs of Circulation are chiefly concerned. We do not affirm, that the affection of the Circulation is the primary change in these diseased actions, but it is the most obvious, and that by which the application of remedies is chiefly guided. Of these, a few appear to consist essentially in alterations of the Heart's Action; the greater number manifestly originate in the Capillary Vessels.

Of Disordered Action of the Heart.

1. Syncope—Its Symptoms and Varieties—Its Causes; both those which act primarily on the Nervous System, and those which act by diminishing the quantity or altering the distribution of the Blood. The Ratio Symptomatum—its importance in relation to other Diseases.

Question, Whether even the causes which alter the quantity or distribution of the blood do not act on the Heart, chiefly through the intervention of Nerves?

2. Palpitation and irregular action of the Heart, (independent of any mechanical obstruction to the Course of the

Blood)—their Symptoms—Causes—and the Ratio Symptomatum.

Of Inflammation.

I. Phenomena or Symptoms of Inflammation.

1. The Local Symptoms resulting from the Inflammatory Action itself.

2. The General or Constitutional Effects resulting from it. Their varieties in different habits of body.

3. General View of the Symptoms, local and general, which may result from the altered functions of different inflamed parts, and which indicate the seat of the inflammation.

II. Local Effects and Terminations of Inflammation.

1. Effusion of Serum—Effusion of Lymph, and its effects—Softening of Textures from Inflammation—Hardening of Textures from Inflammation—Suppuration—Ulceration and its varieties—Gangrene; the Textures in which they chiefly occur; and the symptoms local and general, which result from, or accompany them.

2. Spontaneous termination of Inflammation by Resolution, with or without any of the other results now mentioned;—Abatement of the Symptomatic Fever, consequent on, but not always simultaneous with, this change.

III. Remote or External Causes of Inflammation.

1. The Exciting—Mechanical and Chemical Irritation—Heat—Cold—Poisons—Contagions.

2. The Predisponent. Heat—Cold—Various causes of Debility—Determinations or Congestions of Blood—Previous Inflammation.

IV. Proximate Cause of Inflammation, or Explanation of its Phenomena.

These Phenomena bear so little analogy to any other facts in Nature, that we cannot expect to go far in the explanation of them.

The agency of Injury in exciting local Inflammation, is in some measure illustrated by the observed effect of a stimulus applied to a small Artery; and the agency of other causes is to a certain degree analogous to those phenomena in the healthy body which are called Sympathetic.

Question, Whether any of the External Causes act on the Capillary Vessels that take on this kind of action directly, or all through the intervention of Nerves?

Question, What is the essential nature of the changes effected in the action of the small Capillaries?

Most of the facts relating to Inflammation strongly indicate an *increase* of vital action in the vessels first and chiefly concerned; while others, particularly the distended state of these vessels, and slow motion of blood within them, seem rather to denote a *diminution* of their action on their contents.

Probably neither term exactly denotes the alteration of vital action that occurs, either in the Capillaries in the inflamed state, or in the Heart in the febrile state; but there are facts known in regard to the structure and healthy action of Arteries, which go far to reconcile the appearance of stagnation in the vessels of an inflamed part with the notion of the action of these vessels being increased, at least in the commencement of the affection.

As, however, it is doubtful whether the action of vessels is the sole cause of the motion of blood in the Capillaries; so it is doubtful whether any alteration in their action is the sole cause of the different changes that occur in Inflammation.

The first stage of the Constitutional Fever excited by Local Inflammation, bears a certain analogy to the

phenomena called Sympathetic, and to the effects, on the general System, of the injuries already considered; and many of the subsequent febrile symptoms are explained in the way first suggested by HOFFMAN, and illustrated by CULLEN, by a permanently constricted state of the Capillaries over the System.

The effusions of Lymph and of Serum from Inflammation, and their effects, are natural consequences of an increased action of vessels, and of the properties of the blood; but the circumstances on which the formation or secretion of Pus essentially depends, are very imperfectly understood.

Question, Whether the Hectic Fever of Suppuration depends on absorption of Pus?

The dependence of Ulceration on increased absorption from inflamed parts, has been clearly illustrated by Mr HUNTER, but the causes of this increase are often obscure.

The occurrence of Gangrene from Inflammation is, to a certain degree, illustrated by the general law of diminution of vital power from over excitement; but this effect is almost always dependent, in part, on the influence of some other cause acting simultaneously with the Inflammation, and depressing the vital power.

V. Modes of fatal termination of Inflammatory diseases, illustrated by reference to the simpler cases of violent death already considered.

Inflammation is fatal, either

1. By a rapid depression of the vital powers of the Circulating System, analogous to concussion, and independent of any change of texture in the inflamed part.

2. By Effusion of Serum, causing Coma or Asphyxia.

3. By Effusion of Lymph, causing similar changes.

4. By some of its products, taken into the blood, acting as a poison.

5. By gradual Exhaustion of the vital powers during Suppuration or Gangrene.

6. By passing into, or blending itself with, other kinds of diseased action to be afterwards mentioned.

VI. Varieties of Inflammation.

1. Varieties dependent on the texture affected.—Comparison of the course and effects of Inflammation in different Textures.

2. Distinctions of acute, sub-acute, and chronic Inflammation.—Causes and Effects of these varieties.

3. Distinction of Circumscribed or Phlegmonous, and Diffused or Erythematic Inflammations in External parts; and inquiry whether similar differences exist in internal Inflammations.

4. Distinction of Healthy and Scrofulous Inflammation.

Healthy Inflammation may certainly coexist with Scrofulous Disease, and Scrofulous Action may, in certain circumstances, be excited in a constitution previously healthy. Nevertheless, it is important to observe, and have a name for, the peculiarity of habit, as well as the external circumstances, in which Scrofulous Action is by far the most frequent and most dangerous.

Description of the Scrofulous Habit.

Its External Causes—Hereditary Descent—Climate—Diet—Habits of Life—Other Debilitating Causes—Probable mode and extent of the influence of each.

Question, Whether, or how far, various diseased actions, and consequent disorganizations, to be mentioned afterwards, and which occur chiefly in scrofulous habits, are Effects of Scrofulous Inflammation?

5. Distinction of Simple Inflammation from other varieties which appear to be specific.

Rheumatic Inflammation.

Gouty Inflammation.

Syphilitic Inflammation.

Different species of Cutaneous Inflammation.

Of Local Determinations or Congestions of Blood.

Habit of Body in which these are most apt to occur, (independently of organic disease),—Circumstances which favour them,—Various Symptoms which they may produce in different parts of the body.

Difference between the contents of the Cranium and other parts of the body, in regard to such derangements of the Circulation.

Hæmorrhages, and other kinds of diseased action to which they predispose at different periods of life. Organic Lesions directly resulting from them, particularly in the Lungs and Brain, and their effects.

Of Idiopathic Fever.

I. Its Symptoms, and the changes they denote.

1. Those of a single febrile paroxysm, and its spontaneous solution.

2. Those of the different forms or types of Fever.

3. The Varieties dependent on Concomitant Local Inflammations.

4. The various appearances found on Dissection after Fatal Fevers.

II. The Remote or External Causes of Fever.

Malaria probably the sole Exciting Cause of Intermittent or Remittent Fever,—the proofs of its agency,—the circumstances of its production,—and facts known in regard to its operation.

Circumstances in which a truly Continued Fever appears to originate from a Malaria.

Contagion the chief Exciting Cause of the Common Continued Fever. The evidence by which this is known consists simply of the accumulation of facts, which prove that those who have close intercourse with persons ill of it, are themselves affected (*cæteris paribus*) in a proportion very much greater than those who avoid such intercourse. Circumstances in which the contagious property of the disease is chiefly observed, and facts ascertained in regard to its operation. Period during which the Cause of Fever (whether Intermittent or Continued), lies latent in the System; and Causes which, if applied during this period, appear often to excite the disease.

Causes which predispose the body to suffer from Malaria or Contagion.

Question, Whether the most powerful of these predisposing causes, imperfect nourishment, and mental depression, are of themselves adequate to the production of Fever, which may afterwards spread by Contagion?

III. The Proximate Cause, or Explanation of the Phenomena of Fever.

Limitations imposed by the nature of the subject, on the results of this enquiry.

Attempt made by different authors to refer all Febrile Action to Local Inflammations, and thereby to resolve Idiopathic into Symptomatic Fevers. This theory is neither consistent with facts, nor adequate to the explanation of the phenomena.

Reasons for thinking that the External Causes of Fever act primarily on the Nervous System.

Question, Whether they act on it directly, or by first effecting changes in the Blood?

Analogy of the changes that constitute Fever to the Effects of Concussion,—to the Effects of certain Poisons,—and to the case of Symptomatic Fever already considered. Its distinctions from all these. The peculiar *depression* of Idiopathic Fever is referable only to the peculiar agency of its Causes, but many of its Symptoms are explained in the same way as those of Symptomatic Fever.

Question, still undecided, Whether Critical Evacuations are the cause or the sign of the solution of Fever?

Question, In what manner the different Local Inflammations, often co-existing with Fever, are connected with it?

Question, On what circumstances the Difference of the Varieties and Species of Fever may depend?

IV. Different Modes of Fatal Termination of Fever,—clearly distinguished in some cases, although apparently blended in others.

1. By mere Asthenia.
2. By Coma.
3. By Asphyxia.

Circumstances in which each is chiefly to be dreaded, and causes to which it is to be ascribed.

Cases in which Fever disposes to other kinds of diseased action which succeed it.

Of Febrile Exanthemata.

These belong to the same Class with Contagious Fever, which, indeed, is often attended with an Eruption. The Pathology of these affections is the same; but the concomitant local inflammations are more uniform, and the whole symptoms more regular, in the case of most of the Exanthemata, than in Fever.

Cases in which the different modes of fatal termination above specified are chiefly to be dreaded in the different Exanthemata.

Question, As to the supposed incompatibility of different Febrile or Inflammatory Diseases.

II. The *second* Class of Diseased Actions to be considered, consists of those in which the Functions of Nutrition, Exhalation, and Secretion, and the corresponding function of Absorption, are chiefly concerned.

These have often a manifest connection with preceding Inflammation; but in other cases they are unconnected with it; and in general they imply changes which are not necessary consequences of inflammation, and therefore demand a separate consideration.

Of Diseased Secretions.

1. Diseased States of Secretions concerned in Digestion, including the Bile,—when occurring idiopathically, or constituting the chief existing affections.

2. Diseased States of those destined solely to Excretion, particularly of the Urine and the Menstrual Flux.

The Symptoms and Effects produced by each, whether in the Organs furnishing the Secretions, those connected with them in function, or those more distantly connected with them.

Their remote Causes—Habits of Life—Intemperance of different kinds—Mental anxiety or depression—Heat and Cold—Injuries—Previous disease.

Their explanation necessarily very limited, because they

depend on alterations of a vital property; the operations of which, in the healthy state, are not understood.

Question, how far they depend on increased vascular action.

Question, how far the Nervous System is concerned in producing them.

Their occasional connection with Inflammation, and with Organic Changes of Structure in the parts furnishing them.

The influence they exercise on diseased actions in other parts of the system.

Question, Whether Diabetes is to be considered as essentially a disease of Secretion, of Assimilation, or of generally increased Absorption?

Of Diseased States of the Function of Nutrition.

These are of two kinds. 1. Morbid Growths. 2. Morbid Changes of Texture, without increase of substance.

These Organic Diseases become obvious to the senses only when already somewhat advanced; but their existence is often indicated earlier, partly by symptoms depending on the diseased conditions and diseased actions which produce them, and partly by symptoms depending on the altered functions of the parts in which they form, or with which they are connected.

Taking the Effusion of Coagulable Lymph, such as results from injury or inflammation, as the simplest kind, and often the basis of morbid growths, the most important degenerations from this may be enumerated as follows:

I. Those which are generally local.

1. Sarcomatous Tumours; 2 Encysted Tumours;
3. Osseous Tumours; 4. Scirrhus Tumours.

II. Those which are generally Constitutional.

1. Tubercles,—both the Scrofulous and those unconnected with distinctly Scrofulous Disease.
2. Encephaloid Tumours, or Fungus Hæmatodes.
3. Melanosis.

Usual progress of each of these kinds of Organic Disease,—Symptoms which usually attend the formation of some of them, wherever situated,—Frequent Combination of several of them in the same individual, or even in the same Tumour.

Predisponent and Exciting Causes of these Formations, in the same order as stated in regard to the Secretions;—their explanation similarly limited.

Question, how far they are dependent on increase of vascular action in their neighbourhood;—Essential difference, in this respect, between the simple effect of Inflammation, and a morbid growth that has become organized.

Question, how far they are liable to Absorption.

Examples of morbid changes of texture of solid parts taking place, without either previous increase of substance or ulceration.

Examples of Ulceration, without either distinct previous inflammation, or morbid growths.

Having illustrated these varieties of organic disease, we go on to take a general view of the kinds of these changes usually observed, the Symptoms they excite—their Causes—their Progress—and Consequences,—in each of the following situations :

1. In the Organs of Circulation.
2. In those subservient to Respiration.
3. In those subservient to Digestion and Excretion.
4. In the Nervous System, and Organs of Sense.

5. In the Bones, and other Organs of Locomotion.
6. In the Organs of Generation.

Of Diseased Exhalations.

Symptoms of Dropsical Effusions in different parts of the System;—they are the accompaniments and consequences of other Diseased States, hardly ever the sole Diseases themselves.

External Causes of these;—in a general view, those which excite Inflammation, and those which excite Organic Disease.

Internal Causes, and Explanation of these,—their connection with Inflammation of different parts; with previous Exanthemata; with Organic Disease of the Heart, Lungs, Liver, Kidneys, &c.; with Debility.

The different modes in which Diseases, attended with Dropsical Effusions, prove fatal.

III. The *third* class of Diseased Actions to be considered, consists of those which appear to depend essentially on changes of the Fluids.

Scorbutus.

Diseases observed from damaged or diseased grain.

Diseases observed from other ingesta acting slowly as poisons.

Their Symptoms,—their remote causes,—the variety in the action of these. These diseases are apparently often dependent, not simply on the nature of the ingesta, but partly also on the state of the vital powers.

Purpura, or Hæmorrhœa petechialis. Its symptoms and complications with other diseases. Its causes quite unknown.

Question, Whether the *Specific* Inflammations, the *Contagious* Febrile Diseases, and the *Constitutional* Organic Diseases, depend, in part, on altered conditions of the Fluids? and if so, Whether such alterations result directly from external causes, or are the effect of diseased actions of the Solids? No satisfactory information on this subject to be expected, till the nature and limits of the property, above called Vital Affinity, shall have been better ascertained.

IV. The *last* head of Diseased Actions to be considered, consists of those in which the functions of the Nervous System are chiefly concerned.

Many derangements of the functions of the Nervous System are the effects of other kinds of diseased action, already considered; but some cannot be traced to any such source. Even when themselves dependent on previous diseased states, they often re-act on the functions of other parts, and aggravate or extend the original disorder.

In treating of each of the different derangements of these functions, therefore, we first shortly consider how far it may be the effect of injury,—of disorder of the circulation,—of diseased secretions, and their attendant changes,—or of alteration of texture of the Nervous System itself, or neighbouring parts. Afterwards we examine the cases in which derangement of these functions appears to be the primary disease. As the actions of the Nervous System, in the healthy state, are known only by their effects, we cannot possess any intimate knowledge of their diseased conditions; but we can state the characteristic symptoms of these—their remote causes, so far as they are known—and their usual progress and consequences.

In this way we treat,

1. Of the state of Coma.

2. Of Affections of those Muscles which are habitually moved by the Nerves: Palsy,—Spasm, 1st, Of the simply voluntary Muscles, and 2dly, Of some of the Muscles concerned in Respiration.

3. Of affections of the External Senses, including Anæsthesia, and Neuralgia or Nervous Pain.

4. Of affections of the Mental Faculties: Amentia, and General and Partial Insanity.—The laws by which the succession of thoughts is regulated, are the part of the mental constitution which undergoes the chief alteration in disease. Causes, bodily and mental, which produce such alteration,—its Varieties,—Connections of mental with other diseases.

PART III.

THERAPEUTICS.

As there are first principles in Pathology which could not have been deduced from the Physiology, so there are first principles in Therapeutics, or general facts ascertained in regard to the effect of remedial agents, which are known to us by observation only, and could not have been anticipated *a priori*. Nevertheless, the effect of many remedies is to a certain degree, explained by reference to principles already stated.

Short illustration of the fallacies to which a merely empirical observation of the effects of remedies is liable ; from the variety of individual cases of disease ; from the natural tendency of most diseases to a favourable termination ; from the influence of external causes on the favourable result of cases, different from that to which the result may be ascribed. Consequent reasonableness and importance of endeavouring to correct the conclusions drawn from the simple observation of diseases, and their treatment, by the application of the principles of Physiology and Pathology ; and by the observation of the effects of remedies on the healthy body.

We treat this subject, as nearly as possible, in the same order as the Pathology ; arranging the different classes of remedies according to the functions of the living body, which they appear chiefly to affect, and are used with the intention of affecting.

In regard to each class of remedies we state, first, The effects observed from them on the healthy body, and the mode of their action, when that is referable to any more general principle; next, The general indications whence arise for their application in disease; then the general danger, or inconvenience to be expected from them, and the cautions thence resulting; and lastly, we illustrate these points, by the experience of the use of the remedies in some individual diseases.

I. The *first* class of Remedies to be considered consists of those which are used with the intention of influencing the state of the Circulation.

These are our most powerful remedies. Many of them produce a decided effect on the action of the heart,—all of them affect the distribution of the blood in different branches of the arteries; and, by the alteration they effect there, influence the vital actions in the small capillaries, which are the more frequent seat of disease.

We consider, first, Those which have a direct *Sedative* or depressing influence on the actions of the Heart and Arteries; next, Those which increase the Excretions from, and the afflux of Blood to, certain parts of the system; and by this *derivant* effect, lessen the quantity, and alter the distribution of the blood; next, Those which check excessive Excretions, thereby also altering the distribution of the blood; lastly, Those which excite or *increase* the action of the organs of Circulation.

Of the Antiphlogistic Regimen.

This term includes all such articles of regimen as have the effect of lessening the habitual stimulus, and occasional

irritations, which act on the Vascular System, either directly, or through the intervention of the Nervous System.

1. The regulations in regard to Diet, Temperature, Rest, Quietude, &c. which are most effectual in this way, and constitute the strict Antiphlogistic Regimen, proper in the excited state of the Vascular System, in the height of inflammatory and febrile diseases.

2. The inconveniences which may result from this strict regimen, and consequent modification of it proper in different cases ; on account of the period of inflammation or fever ; on account of the kind of inflammation, (particularly the scrofulous) ; on account of the type of fever ; on account of the previous habits of patients.

3. The modification of the Antiphlogistic Regimen which is most effectual in obviating general plethora and local congestions of blood ; its application to various chronic or habitual diseases ; and the cautions requisite in regard to it, in certain circumstances of these diseases.

Of Bloodletting.

1. The general Sedative effect of loss of Blood on the Circulation, modified by the rapidity of its flow,—its explanation.

Consequent effects of Bloodletting on local diseased actions, and importance of these effects.

Farther effects of loss of Blood ; on the Secretions, when morbidly deficient from febrile action ; and on different Sensations. Consequent usefulness of this remedy as a preliminary to various others.

2. General dangers from Excessive Bloodletting ; the immediate danger of sudden Exhaustion ; often obscured

by the reaction of the System, which takes place, in many persons, after the loss of Blood; the more remote danger—of dropsy?—of nervous disorders;—of debility, and consequently increased liability to disease, from cold, or other exciting causes;—of injurious effect on the subsequent progress of the exciting disease, even when it is successful in relieving the symptoms most urgent, at the time when it is employed;—of injurious effects on one part of the symptoms, in complex cases, even when it is effectual in relieving other parts.

3. Circumstances of patients, in which either the good effects of Bloodletting, or its inconveniences, are chiefly to be expected. General influence of Age, Sex, Habit of Body, Habits of Life, Climate, Season, Period of the existing disease; on the effects to be expected from this remedy.

4. Quantity of Blood generally to be taken in diseases for which this is the main remedy. General view of the circumstances chiefly demanding repetition of the remedy. General indications from the Pulse, and from the appearance of the Blood.

5. Application of these principles to several individual diseases—Acute and Chronic.

Of the Use of Cold as a Sedative.

The natural effect of cold is decidedly and powerfully sedative on living actions, and especially on the circulation; but several circumstances cause it to act indirectly as a stimulant or tonic, especially when applied suddenly, and quickly succeeded by heat.—Circumstances in which its sedative effect is chiefly observed, both when it is applied locally, and when generally, and indications for its use thence resulting.

General danger to be apprehended from its incautious

application. Excessive depression—local determinations of blood—local inflammation; circumstances in which these are most to be dreaded.

Practical results of the application of Cold as a sedative in inflammatory and febrile diseases.

Of the Action of Sedative Medicines.

We give this name to those medicines only which depress the action of the vascular system, with little or no sensible evacuation, and no corresponding effect on the nervous system; reserving the term Narcotic for those which depress the action of the nervous system, with little or no effect on the vascular.

Truly sedative effect from certain poisons. Few medicines useful in this way. Use of tartar-emetic, of digitalis, of colchicum, of tobacco, of hydrocyanic acid?—Effect on the circulation from these, and indications thence arising—Dangers from excessive use of all these—Circumstances of inflammatory and febrile diseases, in which they have appeared most useful.

Statements of Italian physicians in regard to the effects observed from various medicines, called by them contro-stimulants in such diseases—Brief objections to the theory that has been connected with these observations.

Cases in which a morbid excitement of the vascular system is connected with debility, and is best obviated by tonics.

Of the Antiphlogistic Effect of Emetics.

Substances used with this intention;—their mode of operation—question if they are necessarily absorbed into the blood;—their evacuating power is small, but they may

act beneficially on the state of the circulation, by the sedative influence of the nausea accompanying their action, and by the alteration they effect on the distribution of the blood, and on various secretions.

Inconvenience or danger to be apprehended,—in different cases,—from the exertion attending the act of vomiting,—from the congestion of blood thereby caused in the head,—from the ultimate effect of repeated vomiting on the stomach.

Application of these principles in the case of several diseases—chiefly inflammations affecting the chest, and fevers.

Of the Antiphlogistic Effect of Cathartics.

Enumeration of the substances generally used, as mild or cooling laxatives, as stomachic aperients, as drastic cathartics. Advantages from combinations of these.

Questions as to their absorption into the blood, and their mode of operation. Their general effects on the state of the circulation—by the evacuation of part of the fluids of the body,—by a direct sedative influence on the heart,—by increase of certain secretions and alteration of the distribution of the blood,—by removing irritations which excite the vascular system.

Indications thence arising, and general means of judging of the propriety of their use.

General danger from excessive use of cathartics—on the functions of the primæ viæ—on the whole system; increased liability to inflammation in the parts, of which the secretions are thus excited.

Application of these medicines in various cases, where their beneficial effect appears to be chiefly on the state of the circulation;—in inflammatory and febrile diseases;—

in chronic diseases, attended with general or local plethora;—in those attended with chronic external inflammation.

Of the Antiphlogistic Effect of Diaphoretics.

Medicines, and combinations of medicines, used with this intention, and means of promoting their effect. Their mode of operation; the circumstances of disease in which they are most effectual;—not until the force of increased vascular action has been moderated, either by previous remedies, or by the course of the disease.

General effects from these remedies—on the quantity of the fluids—on their distribution—on the temperature of the body—consequent indications.

Danger of excessive stimulation, and of bad febrile symptoms, from the early or incautious use of these remedies. Danger of debility, and especially of increased liability to inflammatory disease, from their excessive or long continued use.

Results of experience in regard to the acute diseases, in which evacuation by sweating appears most important.

Question, as to the peculiar virtues ascribed to Calomel and Opium in inflammatory and febrile complaints? Habitual use of milder diaphoretics in various chronic diseases.

Of the Action of Errhines, Sialagogues, and Expectorants.

The action of various substances on the secretions of the nose and mouth is peculiar, but availed of only in a few

cases, where the alteration of the distribution of blood thus effected may be useful.

Question, How far the specific effect of Mercury on the mouth is desirable in any case?

Different medicines and expedients, by which Expectoration appears to be somewhat promoted. Important effects on the circulation thence to be expected in various diseases, and clear indication for their use. Their frequent inadequacy, and its causes. Circumstances of acute and chronic diseases to which they are best adapted; and different means of promoting their effect in different cases.

Of the Action of Counter-Irritants.

Different means employed to excite inflammation of the skin, in the view of causing derivation of blood from diseased parts.

Facts in the history of diseases which illustrate their effect. General caution in regard to their use, on account of the pain and irritation they excite, and the limited effect to be expected from them. Circumstances and period of acute diseases, and cases of chronic diseases, in which experience shews them to be most important.

Of the Action of Diuretics.

Substances which appear to exert a specific effect on the Kidneys—their combinations—their frequent inefficacy—Circumstances which appear to frustrate or promote their action.

Inconvenience or danger which may result from the excessive use of Diuretics—chiefly on account of the other effects of these Medicines on the System.

Their derivant effect on the Circulation may sometimes

be useful ; but their chief beneficial effect is by indirectly increasing absorption, which will be mentioned afterwards.

Of the Action of Emmenagogues.

Cases in which the retention of the Menses is not a proper object of practice. Cases in which it is best remedied, by means already considered, or by others acting primarily on other departments of the System.

Question, as to the Specific Action of any medicines on this secretion. Enumeration of those which seem most effectual. Their Combinations, and the circumstances favouring their action. Caution on account of their stimulating effects in many complex cases. Beneficial effects on various functions, which result from the successful employment of means for this purpose, in cases adapted to them.

Of the Action of Astringents.

Enumeration of these, vegetable and mineral ; their application, local and general. Their mode of action partly chemical, but the effect of internal astringents cannot be explained in that way. The degree of their effect, and general indication for their use.

Hæmorrhages and increased Excretions are connected in different cases with very different states of the Circulation in the larger vessels, and therefore different means are effectual in checking them ; but when the circulation at large is not stronger than natural, they may often be beneficially checked by these remedies.

General caution in regard to the use of Astringents, lest the discharge to which they are applied be either critical, or a preservative from worse diseases. Cases in which they are found to be most useful.

Of the Action of Stimulants on the Circulation.

Increase and diminution of the action of the Vascular System, and of the action of the Nervous System, are by no means generally simultaneous ; and the indications for producing these effects are perfectly distinct : it is therefore right to consider separately the action of stimulants on these different parts of the animal economy.

Enumeration of the different means by which the Vascular System may be stimulated, either directly, or through the intervention of the Nervous.

Question, as to the Absorption of stimulating substances into the blood,—or their power of affecting the Heart's action sympathetically.

Excessive generalization attempted by different authors, of the effects of this, and other classes of remedies, especially of Sedatives and Narcotics. Almost all Stimulants act efficiently as such, only when applied within certain limits ; and, if applied in excess, produce an ultimate sedative effect, generally first on the Nervous, and then on the Vascular System ; but this last effect is various in different cases, bears no fixed proportion to the previous stimulating effect, and cannot be reasonably ascribed to the circumstance of previous stimulation as its cause.

General indications for the use of Stimulants. Vagueness of the term “ Disease of Debility.” The indication for stimulants exists, in general, whenever there is danger of death occurring in the way of simple Asthenia, without any considerable disorder of the Functions of the Brain or Lungs. This happens at different periods, in many different diseases, and when it exists, is of paramount importance ; but there is hardly any disease in which it occurs necessarily and uniformly, as the sole cause of danger.

General cautions, in regard to the use of stimulants, on account of the complication of the causes of danger in many diseases, and the possible aggravation of one by remedies which may avert another; and on account of the ultimate exhausting effects of most stimulating remedies when used in excess.

Practical application of Stimulants to various cases of injury, or threatenings of sudden death,—to inflammatory and febrile diseases,—to chronic or non-febrile diseases.

Of the Action of Tonics on the Circulation.

We here state, first, what has been ascertained of the articles of *Regimen*, which are most truly strengthening to the Circulation, and the other functions dependent on it. Regulation of Diet, Air, Temperature, Cold or Tepid Baths, Frictions, Exercise, Mental Occupation and Excitation, with this view. Reference to the experience of men trained for athletic exercises. Reference to Statistical Tables, proving the salubrity of rural occupations, as compared with the mode of life of the inhabitants of great towns.

Mode of action of these articles of *Regimen*;—by increasing the stimulating power of the blood, by habitually exciting, and therefore strengthening, all muscular organs,—by equalizing the distribution of the blood, and invigorating the circulation on the surfaces of the body, and thereby promoting digestion. Cautions necessary in the use of these several articles of *Regimen*, on account of their exhausting effects when used in excess; and on account of the complex nature of many diseases in which debility prevails.

Medicines, vegetable and mineral, which are thought to possess a similar tonic virtue; inconveniences from the use

of some of these, and circumstances often frustrating their effect. Question, Whether any of these possess a truly tonic power over the Vascular System, independently of their effect on the Function of Digestion, and therefore on the contents of that system?

Use of the Tonic Regimen and Remedies, in preventing Acute Diseases, resulting from Cold, from Contagion, or Malaria; and in counteracting the tendency to Scrofula and other chronic habitual diseases. Statistical statements illustrating these points.

Tonic Plan of Treatment in the advanced stage of certain acute diseases; in the convalescence from them; in various chronic diseases, and in cases where these diseases may be apprehended.

II. The *next* class of remedies to be considered, consists of those which are used with the intention of *directly* influencing the functions of exhalation, secretion, and nutrition, to which the circulation is subservient. An ultimate effect on these actions is very often the object of remedies already considered; but they effect it by means of changes in the movement of the blood in the larger vessels. The action of other remedies on these functions seems to be independent of any alteration in the motion or distribution of the blood in the larger vessels, and referable only to some modification of the vital powers with which the small capillaries and absorbents are endowed.

Of the Action of Sorbefacients.

We here consider, first, the observed indirect effect produced on the absorption of fluids exterior to the circula-

tion, by different evacuations already considered, blood-letting, emetics, cathartics, diuretics, diaphoretics, and counter-irritants; the physiological principles on which their action appears to depend; the circumstances of disease (particularly of dropsical affections), in which their beneficial action is to be expected; the circumstances by which that is most frequently frustrated; the cautions necessary in their use; the cases to which they appear severally best adapted; and the combinations with each other, or with other remedies acting on the general health, in which they are most successfully employed.

We then mention the other remedies, local and general, which appear to promote the absorption of effused fluids, independently of any obvious evacuating effect; and the application of these in the different dropsical affections.

Of the Action of Deobstruents and Alteratives.

When solid matter is deposited, in morbid quantity, in any part of the body, it is much less under the control of any general evacuating remedies than fluids are; but still liable to much change from absorption; and various remedies appear manifestly to increase that absorption, either absolutely or relatively to the deposition. The same remedies appear, in different cases, to produce an alteration on secretions, natural or morbid, in different parts of the system, without increasing their quantity.

Enumeration of the remedies, local and general, from which these effects have been observed. Mercury, the most powerful of the general remedies of this class. Speculations in regard to their mode of action, especially of those which act locally, and which have generally a manifest stimulating effect.

Cases in which morbid deposits may be expected to be

under the influence of these remedies, very limited. Effect, in this way, which can reasonably be ascribed to them. Sources of fallacy connected with observations made on their use. Dangers which result from their other effects on the system, if they are used incautiously or in excess.

Application of these remedies in individual cases; in inflammations tending to effusion of lymph, in different textures; in cases of morbid secretions without breach of texture; in certain descriptions of tumours; in certain ulcerations, especially venereal; in chronic cutaneous diseases. General views of the circumstances by which their action may be impeded or promoted in different cases.

General statement of the cases in which the Excision or Destruction of the diseased part is the chief resource.

III. The *next* head of Remedies consists of those which are destined to influence only the function of Digestion, or the condition of the *Primæ Viæ*.

Here we state, first, the dependence of the condition of these parts on Diet and Regimen; then the effect on them produced by the different classes of remedies already considered; by the different evacuations; by alteratives; by astringents; and by stimulants and tonics; the mode of action of each, and the general circumstances of disease to which each class is adapted.

We then consider generally the influence of remedies directed to the correction of the disorders of these parts, on the diseases of other parts of the system; and the cautions and limitations with which this kind of practice should be pursued.

Lastly, we consider the means we possess of expelling

or counteracting the noxious effects of foreign bodies lodged in the Alimentary Canal.

Of the Action of Anthelmintics.

Enumeration of Substances, vegetable and mineral, used with this view ; their different modes of action, and the way of administering them. Difficulty of judging, from the symptoms they excite, of the presence of Worms in the Intestines. Cautions in regard to the use of active medicines for expelling them ; and importance of remembering that more serious complaints often coexist with, or supervene on, their presence. Beneficial effects, on various functions, nevertheless often observed to follow their expulsion.

Of the Corrignents of the different Poisons.

When Poisons have been taken into the circulation, and produced their specific effects, these may often be in some degree counteracted, by remedies adapted to the nature of these effects ; but we state here only the Expedients used with the intention either of evacuating the poisons from the Primæ Viæ, or of correcting their noxious qualities, before they leave the stomach.

1. Emetics best suited for this purpose ; means of aiding their effects ; mechanical contrivances for securing the evacuation of the stomach. Cases in which they are most important.

2. Means of correcting the noxious qualities of poisons, —by the use of diluents and demulcents only ;—by the use of substances which form chemical compounds with the poisons, which are wholly or nearly innocuous. Different sub.

stances which have this effect in the case of the different mineral poisons. Question as to the advantage from any such means in the case of the vegetable poisons.

IV. The *next* Class of Remedies consists of those which appear to act chiefly on the Constitution of the Fluids of the Body.

The great and manifest alterations of the composition and properties of the fluids, which take place in disease, are evidently much under the control of the vital powers; are often corrected, spontaneously, or by help of remedies, without the application of any cause that can be supposed to affect them by a merely chemical action; and are apparently very seldom influenced by causes which act on chemical principles only. The following instances only, of the action of remedies apparently on these principles, demand consideration.

I. The effect on the Symptoms of Scorbutus, produced by nutritious Food, by Vegetable Aliment, and especially by Vegetable Acids.

Question, How far Scorbutus depends on deficient nourishment only, and how far on the use of salted provisions—degree of influence of other causes besides diet in producing it; and of other remedies besides those acting chemically, in counteracting it.

II. The effect on the Symptoms of Diabetes produced by Animal Diet.

Question, How far the essential characteristics of the disease are influenced in this way—Sources of fallacy in the observations on the subject.

Question, Whether the degree of effect observed is to be explained by a chemical action, or by an alteration of vital actions.

III. The effect on the Symptoms of Gravel, produced by remedies fitted to act on the chemical constitution by the urine.

Different alkaline and acid remedies used in these complaints. Cases adapted to the use of each. Degree of advantage to be derived from them. Question, Whether their beneficial effect is strictly on the composition of the urine, or rather on the function of digestion, and composition of the blood?

IV. Supposed chemical action of preparations of Lime in Rickets. Doubts as to the reality of this effect.

V. The *last* head of Remedies to be considered, consists of those which are designed to act chiefly on the functions of the Nervous System.

The morbid conditions of the Nervous System, especially when occurring in febrile and inflammatory diseases, are often more effectually controlled by remedies already considered, which act on it through the vascular system, or by remedies improving the condition of the primæ viæ, than by such as have any specific action on the Nervous System. We treat here only of those which produce such an effect on Sensation, Thought, or Voluntary Motion, as cannot be explained by their influence on other functions.

Two facts are remarkable, in regard to the action of these remedies: 1. That the impressions they produce,

like those produced by the causes of Sensation, are liable to continual diminution from repetition ; 2. That the effect of these impressions, like that of all other causes acting on the Nervous System, depends very much on the degree of intensity with which any previous cause may have acted on it ; being always less, as the action of that previous cause has been greater. From these circumstances it happens, that the dose of medicines acting on the Nervous System, necessary to procure their good effect, is liable to much greater variation than that of any others.

Of the Action of Narcotics.

Circumstances which dispose the body to sleep, independently of medicines.—Enumeration of Vegetable Substances which have this effect, and of those used with this intention. Description of their effects, and the varieties of these. Their narcotic effect not dependent on their action on the circulating system, although they produce effects there also.

Question, Whether they are necessarily absorbed into the blood, in order to affect the brain and nerves ? Circumstances which promote or counteract their effect—General indications for their use, and general cautions, drawn from observation of the circumstances which oppose their action, and from knowledge of their effects on the circulation in acute cases, and on the digestion in chronic. Observations on the use of Narcotics, especially of Opium, in some of the more important diseases—inflammatory, febrile, functional, and organic.

Of the Action of Antispasmodics.

The narcotics are the most powerful remedies of this kind ; but others, which have no narcotic effect, have a certain amount of influence on spasms of the voluntary muscles when actually present. Enumeration of these. Their effect generally referable to the principle of one strong impression on the Nervous System always superseding another. Influence of pungent sensations and strong mental impressions in this way. Cases of Spasmodic diseases in which these remedies are the most useful,—generally the slighter spasms only. Caution as to their use in spasms connected with strong vascular action, or organic disease.

Of the Action of Tonics and Stimulants on the Nervous System.

The term Tonic, in relation to the Nervous System, is applied to the remedies which, when used habitually for some time, appear to render it less liable to take on a state of diseased action, whether spasm or nervous pain, or such disorder as seems to precede the developement of inflammation or fever. The general Tonic Regimen has an influence in this way ; but several medicines shew, in different instances, effects of this kind, which may be called Specific.

Enumeration of the circumstances of febrile, spasmodic, and painful diseases, in which most reliance is to be placed on them.

Medicines and other expedients, from which a simply stimulating effect on the actions of nerves has been observed. Cautions necessary in regard to the use of these

in nervous complaints, chiefly on account of their simultaneous action on the vascular system.

Of the Action of Mental Causes on the Nervous System.

The influence of mental causes, acting through the Nervous System, on the different *bodily* functions, having been already noticed, we have here only to consider the *phenomena mentis* in the diseases of the mind itself.

The state of violent or perfect delirium admits of none but generally tranquillizing measures or restraint; but when Insanity is partial only, and many trains of thought take place nearly in the natural way, advantage may often be taken of the principle of one strong impression upon, or action in, the Nervous System, superseding or suspending another,—to withdraw the mind indirectly from those trains of thought in which morbid phenomena are exhibited.

Importance of various applications of this principle, established by much experience, in the management of cases of Hypochondriasis, Mania, and Melancholia.